UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/870,986	06/01/2001	Ravi F. Saraf	00-151(01640259AA)	7552

7590 02/28/2002

McGuire Woods, LLP
Suite 1800
1750 Tysons Boulevard
McLean, VA 22102

EXAMINER	
CHAKRABARTI, ARUN K	
ART UNIT	PAPER NUMBER
1634	6

DATE MAILED: 02/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/870,986	Saraf
Examiner	**Art Unit**
Arun Chakrabarti	1655

-- **The MAILING DATE of this communication appears on the cover sheet with the correspondence address** --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on Feb 5, 2002 .

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-23 is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-23 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
18) ☐ Interview Summary (PTO-413) Paper No(s). _____
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other:

DETAILED ACTION

Election/Restriction

1. Applicant's election of Group I, corresponding to claims 1-23 without traverse, is hereby acknowledged.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is rejected as indefinite because the instantly claimed method lacks a final process step that clearly relates back to the preamble. For the method of claim 1, the preamble of the instantly claimed method is drawn to a method to detect binding of molecules while the final process step is that of measuring photoluminescence from the sensor and it is thus unclear as to whether the instantly claimed methods are drawn to a method to detect binding of molecules or rather measuring photoluminescence from the sensor. Method claim requires a last step or phrase in the last step that states the accomplishments of the goals for the method which were stated in the method's preamble. Claim 1 lacks such a last step and are confusing because the additional method step is not sufficiently set forth. While minute details are not required in method claims,

at least the basic steps must be recited in a positive, active fashions. See Ex parte Erlich, 3 USPQ2d1011, p.1011 (Bd. Pat. Applicant. Int. 1986). It is suggested that an amended claim more clearly describing the intended steps be submitted.

Claims 1 , 11 and 20 are rejected over the recitation of the phrase, "including" and "includes". Regarding claims 1, 11, and 20, the phrase "including" and "includes" render the claims indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention.

Claim 8 is rejected over the recitation of the phrase "group II and group VI". It is not clear compounds of which groups are claimed here, especially in the absence of any Groups in the specification. The metes and bounds of the claim is vague and indefinite.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CAR 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-5, 7, 13-17, and 19-20 are rejected over Leland et al. (U.S. Patent 5,962,218) (October 5, 1999) in view of Charra (U.S. Patent 5,831,259) (November 3, 1998).

Leland et al teach a method to detect binding of molecules, comprising the steps of:

a) providing a sensor comprised of a single stranded nucleic acid sequence and a photoluminescent material;

b) exposing the sensor to a biological sample for sufficient time for the single stranded nucleic acid sequence to bind a material of interest in the biological sample;

c) exposing the sensor to light and measuring photoluminescence from the sensor (Claim 1 and Column 7, line 23 to column 8, line 46).

Leland et al teach a method , wherein the single stranded nucleic acid is different DNA molecules having 5-200 base pairs (Figures 4-5 and Examples 29-30).

Leland et al do not teach a tagging free method, providing a first layer of oligomer and a second layer of photoluminescent material consisting of aromatic polymers embedded in the matrix material.

Charra teach a tagging free method, providing a first layer of oligomer and a second layer of photoluminescent material consisting of aromatic polymers embedded in the matrix material (Abstract and Figures 1-4 and column 4, lines 1-67).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the tagging free method, providing a first layer of oligomer and a second layer of photoluminescent material consisting of aromatic polymers embedded in the matrix material of Charra in the process of Leland et al., since Charra states, "In the present invention, the use of reduced size oligomers decreases the mobility of the charges and therefore minimizes energy consumption (Column 5, lines 40-42)." By employing scientific reasoning, an ordinary practitioner would have combined and substituted the tagging free method, providing a first layer of oligomer and a second layer of photoluminescent material consisting of aromatic polymers embedded in the matrix material of Charra in the process of Leland et al in order to improve the process for determining the hybridization of a nucleic acid sample. An ordinary practitioner would have been motivated to combine and substitute the tagging free method, providing a first layer of oligomer and a second layer of photoluminescent material consisting of aromatic polymers embedded in the matrix material of Charra in the process of Leland et al., in order to achieve the express advantages, as noted by Charra, of an invention that provides use of reduced size oligomers which decreases the mobility of the charges and therefore minimizes energy consumption.

6. Claims 1-7, 11-17, and 19-20 are rejected over Leland et al. (U.S. Patent 5,962,218) (October 5, 1999) in view of Charra (U.S. Patent 5,831,259) (November 3, 1998) further in view of Leising et al. (U.S. Patent 6,117,529) (September 12, 2000).

Leland et al in view of Charra teach a method of claims 1-5, 7, 13-17, and 19-20 as described above.

Leland et al in view of Charra do not teach a matrix layer comprising polystyrene.

Leising et al .teach a matrix layer comprising polystyrene (Column 5, lines 5-36).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute a matrix layer comprising polystyrene of Leising et al in the process of Leland et al .in view of Charra, since Leising et al. state, "Such matrices therefore enhance the resolution (Column 15, lines 35-36)." By employing scientific reasoning, an ordinary practitioner would have combined and substituted a matrix layer comprising polystyrene of Leising et al in the process of Leland et al. in view of Charra in order to improve the process for determining the hybridization of a nucleic acid sample. An ordinary practitioner would have been motivated to combine and substitute a matrix layer comprising polystyrene of Leising et al in the process of Leland et al. in view of Charra, in order to achieve the express advantages, as noted by Leising et al, of such matrices which enhance the resolution.

7. Claims 1-5, and 7-23 are rejected over Leland et al. (U.S. Patent 5,962,218) (October 5, 1999) in view of Charra (U.S. Patent 5,831,259) (November 3, 1998) further in view of Bhargava et al. (U.S. Patent 6,241,819 B1) (June 5, 2001).

Leland et al in view of Charra teach a method of claims 1-5, 7, 13-17, and 19-20 as described above.

Leland et al in view of Charra do not teach doped or undoped zinc sulfide in a nanocomposite.

Bhargava et al teach doped or undoped zinc sulfide in a nanocomposite (Abstract and Column 3, line 45 to column 4, line 4, and Claims 1 and 20).

Leland et al in view of Charra do not teach the use of ultraviolet light with wavelength in the range of 200-700 nm.

Bhargava et al teach the use of ultraviolet light with wavelength in the range of 200-700 nm (Abstract and Column 3, line 45 to column 4, line 21, and Figure 2).

Leland et al in view of Charra do not teach the first layer positioned on a first side of the second layer, and the second side is opposite the first side on the second layer and the measuring step measures photoluminescence reflected from the first and second side of the second layer.

Bhargava et al teach the first layer positioned on a first side of the second layer, and the second side is opposite the first side on the second layer and the measuring step measures photoluminescence reflected from the first and second side of the second layer (Column 2, line 65 to column 4, line 49).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the doped or undoped zinc sulfide in a nanocomposite and the use of ultraviolet light with wavelength in the range of 200-700 nm of Bhargava et al in the process of Leland et al. in view of Charra, since Bhargava et al. state, "The present application also provides methodology for manufacturing quantum size doped

semiconductor particles. The methodology is particularly advantageous in that it provides a relatively simple approach to the manufacture of doped quantum sized semiconductor particles at room temperature. Furthermore, the particles so produced are dispersed within a polymer matrix and the reaction which forms the doped particles takes place in the polymer matrix. Thereafter, the polymer matrix maintains the doped particles separate from one another so that they maintain their quantum physical effects without agglomeration (Column 2, lines 6-17) " By employing scientific reasoning, an ordinary practitioner would have combined and substituted the doped or undoped zinc sulfide in a nanocomposite and the use of ultraviolet light with wavelength in the range of 200-700 nm of Bhargava et al in the process of Leland et al. in view of Charra, in order to improve the process for determining the hybridization of a nucleic acid sample. An ordinary practitioner would have been motivated to combine and substitute the doped or undoped zinc sulfide in a nanocomposite and the use of ultraviolet light with wavelength in the range of 200-700 nm of Bhargava et al in the process of Leland et al. in view of Charra, in order to achieve the express advantages, as noted by Bhargava et al, of an invention which provides methodology for manufacturing quantum size doped semiconductor particles and which is particularly advantageous in that it provides a relatively simple approach to the manufacture of doped quantum sized semiconductor particles at room temperature and furthermore, the particles so produced are dispersed within a polymer matrix and the reaction which forms the doped particles takes place in the polymer matrix that maintains the doped particles separate from one another so that they maintain their quantum physical effects without agglomeration.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arun Chakrabarti, Ph.D., whose telephone number is (703) 306-5818. The examiner can normally be reached on 7:00 AM-4:30 PM from Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones, can be reached on (703) 308-1152. The fax phone number for this Group is (703) 305-7401.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0196.

Arun kr. Chakrabarti

ARUN K. CHAKRABARTI
PATENT EXAMINER

Arun Chakrabarti,

Patent Examiner,

February 14, 2002